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20.   Apparatus, comprising:

a switch, for receiving content data streams from each of a plurality of server modules and multiplexing said content data streams to form an output stream transmitted along a high speed asynchronous serial interface (HS-ASI) communications channel, each of said content data streams comprising a plurality of extents, each of said extents defining a respective content portion;

a format converter, for formatting non-content data for use by said communications channel; and

a controller, for receiving said non-content data and for causing said switch to insert corresponding HS-ASI formatted non-content data into said output stream.

21.   The apparatus of claim 20, wherein said switch comprises a data buffer for storing said HS-ASI formatted non-content data.

23.   The apparatus of claim 20, wherein said non-content data comprises an internet protocol (IP) data format.

29.   A method, comprising:

multiplexing a plurality of content stream portions to produce an output stream, said output stream being adapted to a high speed asynchronous serial interface (HS-ASI) communications channel;

transmitting said output stream via said HS-ASI channel;

determining if said HS-ASI channel has associated with it a bandwidth utilization level below a threshold level; and

inserting, into said output stream, HS-ASI channel formatted non-content data in response to available HS-ASI channel bandwidth.

REMARKS

This amendment is intended as a full and complete response to the Action mailed December 19, 2002. In the Action, the Examiner notes that claims 11-31 are pending, of which claims 11-31 stand rejected. By this amendment, claims 11, 12,

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18-21, 23, and 29 are amended and claims 13-17, 22, 24-28, 30, and 31 continue unamended.

In view of both the amendments presented above and the following discussion, the applicants submit that none of the claims now pending in the application are non-enabling, anticipated, or obvious under the respective provisions of 35 U.S.C. §112, §102, and §103. Thus, the Applicants believe that all of these claims are now in allowable form.

It is to be understood that the Applicants, by amending the claims, do not acquiesce to the Examiner's characterizations of the art of record or to applicants' subject matter recited in the pending claims. Further, applicants are not acquiescing to the Examiner's statements as to the applicability of the prior art of record to the pending claims by filing the instant responsive amendments.

Objections

IN THE SPECIFICATION

The Examiner has objected to Specification and has required Applicant to provide the U.S. Application No. referred to in page 10, lines 21-22. In response thereto, Applicants have amended the Specification to indicated that the current application was simultaneously filed U.S. Patent Application No. 09/458,339, as indicated above. Therefore, Applicants request reconsideration and withdrawal of the objection to the Specification.

IN THE DRAWINGS

The Examiner has objected to the drawings for failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include server modules 120 mentioned on page 13, line 30 of the Specification.

Applicants have amended the Specification to correct the typographical error, as indicated above. Page 13, line 30 of the Specification now indicates that the server modules are element 220. FIG. 2 and the remainder of the Specification support this amendment. As such, Applicants respectfully submit that amendments

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to the drawing are unnecessary. Therefore, the Applicants respectfully request reconsideration and withdrawal of the objection to the drawings.

REJECTION UNDER 35 U.S.C. §112

The Examiner has rejected claims 12-16 and 23 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that applicants regard as the invention. Specifically, the Examiner stated that in line 6 of claim 12, the term "contents of said buffer" is unclear and in lines 2-3 of claim 23 "said second formal" lacks antecedent basis. Applicants traverse this rejection.

Applicants have amended claim 12, as indicated above. As such, Applicant submits that claim 12 as amended fully complies with 35 U.S.C. §112. In addition, claims 13-16 (which depend from claim 12) which contain the features of amended claim 12 also comply with 35 U.S.C. §112.

In addition, Applicants have amended 23, as indicated above. As such, Applicants submit that claim 23 fully complies with 35 U.S.C. §112.

Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 12-16 and 23.

DOUBLE PATENTING

The Examiner has objected to claim 19 under 37 C.F.R. §1.75 as being a substantial duplicate of claim 18. Applicants have amended claims 18 and 19, as indicated above. Applicants respectfully submit that claims 18 and 19, as amended, do not claim the same subject matter. As such, Applicants request reconsideration and withdrawal of the double patenting rejection of theses claims.

REJECTION OF CLAIMS UNDER 35 U.S.C. §102

A. **Claims 11-14, 17-29**

The examiner has rejected claims 11-14 and 17-19 under 35 U.S.C. 102(e) as being anticipated by Adams (U.S. Patent 6,044,396, issued March 28, 2000) (Adams). Applicants traverse this rejection.

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Adam discloses a system for allocating resources by utilizing a multiplexer that selects from among encoded information streams according to a round robin scheme. Each video stream has a video buffer. "If and when all of the video buffers are empty then a selector passes data from the application buffer to the output buffer. The selector will continue reading from the application buffer until data is detected in one or more of the video buffers. At that time, the selector will again read from the video buffers in a round-robin fashion." (See Adams column 4, line 52 to column 5, line 8; and Adam's FIG. 5).

Applicants' claim 11 recites:

"In an information distribution system comprising server equipment providing content to subscriber equipment via <u>a high speed asynchronous serial interface (HS-ASI) communications channel</u>, server apparatus comprising:
a switch, for multiplexing each of a plurality of content streams provided by respective server modules to produce an output stream adapted for transport via said communications channel;
said switch <u>receiving non-content data from a data source, formatting said received data for use by said communication channel, and responsively multiplexing said formatted non-content data into said output stream on a bandwidth availability basis</u>." (Emphasis added).

In contrast to the above-quoted claim language, Adams is not directed to at least the transmission of high speed asynchronous serial interface (HS-ASI) formatted <u>non-content data into an output stream on a HS-ASI bandwidth availability basis</u>. Applicants disclose a method and apparatus for formatting non-content data for output into a high speed asynchronous serial interface (HS-ASI) on a bandwidth availability basis.

"Anticipation requires the presence in a single prior art reference disclosure of <u>each and every element of the claimed invention</u>, arranged as in the claim" (<u>Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.</u>, 730 F.2d 1452, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984)(citing <u>Connell v. Sears, Roebuck & Co.</u>, 722 F.2d 1542, 220 U.S.P.Q. 193 (Fed. Cir. 1983)) (emphasis added). The Adams reference fails to disclose <u>each and every element</u> of the claimed invention, <u>as arranged</u> in the claims. For at least the reasons discussed above, Applicants requests that the Examiner reconsider and withdraw the rejection of claim 11. In

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addition, dependent claims 12-19 (which depend from independent claim 11) are allowable at least for their dependency upon independent claim 11.

B.   Claims 11-22, 24-27 and 29-31

The Examiner has rejected claims 11-22, 24-27 and 29-31 under 35 U.S.C. 102(e) as being anticipated by Arazi et al. (U.S. Patent No. 5,966,120, issued October 12, 1999) ("Arazi"). Applicants traverse this rejection.

Arazi discloses a method and apparatus for constant bit rate distribution ("CBR") of primary programs, along with auxiliary data to one or more receivers. Arazi utilizes a variable bit rate ("VBR") data stream and converts the VBR to a CBR data stream by inserting auxiliary data where fill packets would have otherwise been used to create a CBR data stream. (See Arazi at column 1, line 65 to column 4, line 6). Arazi is not directed to at least the transmission of HS-ASI formatted non-content data into an output stream on a bandwidth availability basis.

Applicants submit that Arazi does not anticipate Applicants' claimed invention.

I.   Claims 11-19

Applicants have already provided a brief description of Applicants claim 11 and the reasons for patentability therefor (in section "A" herein). Applicants submit that the features, which distinguish Applicants' invention from Adams also serve to distinguish Applicants' invention from Arazi. Applicants believe that the distinctions already provided (in section "A" herein) and the above-description of Arazi (in section "B" herein) clearly demonstrate that Arazi does not anticipate Applicants' claim 11.

At least for the reasons above, Applicants requests that the Examiner reconsider and withdraw the rejection of claim 11. In addition, dependent claims 12-19 (which depend from independent claim 11) are allowable at least for their dependency upon independent claim 11.

II.   Claims 20-22, 24-27

Applicants' claim 20 positively recites:

"Apparatus, comprising:
        a switch, for receiving content data streams from each of a plurality of server modules and multiplexing said content data streams to form an output stream transmitted along <u>a high speed asynchronous serial</u>

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interface (HS-ASI) communications channel, each of said content data streams comprising a plurality of extents, each of said extents defining a respective content portion;
a format converter, for formatting non-content data for use by said communications channel; and
a controller, for receiving said non-content data and for causing said switch to insert corresponding HS-ASI formatted non-content data into said output stream." (Emphasis added).

As already indicated above, Arazi is silent with respect to the conversion of non-content data into a format for transmission along an HS-ASI. Further, Arazi does not disclose a controller for "for receiving said non-content data and for causing said switch to insert corresponding HS-ASI formatted non-content data into said output stream," as claimed by Applicants. As such, Arazi does not meet the requirements for anticipation. At least for the reasons above, Applicants requests that the Examiner reconsider and withdraw the rejection of claim 20. In addition, dependent claims 21-27 (which depend from independent claim 20) are allowable at least for their dependency upon independent claim 20.

III. **Claims 29-31**

Applicants' claim 29 positively recites

"A method, comprising:
multiplexing a plurality of content stream portions to produce an output stream, said output stream being adapted to a high speed asynchronous serial interface (HS-ASI) communications channel;
transmitting said output stream via said HS-ASI channel;
determining if said HS-ASI channel has associated with it a bandwidth utilization level below a threshold level; and
inserting, into said output stream, HS-ASI channel formatted non-content data in response to available HS-ASI channel bandwidth."

Applicants' claim 29 specifically recites the insertion of HS-ASI channel formatted non-content data in response to available HS-ASI channel bandwidth. As already presented, Arazi does not recite these features. As such, Arazi doe not anticipate Applicants claim 29. At least for the reasons above, Applicants requests that the Examiner reconsider and withdraw the rejection of claim 29. In addition, dependent claims 30 and 31 (which depend from independent claim 29) are allowable at least for their dependency upon independent claim 29.

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REJECTION OF CLAIMS UNDER 35 U.S.C. §103(a)

Claim 23

The Examiner has rejected claim 23 under 35 U.S.C. §103(a) as being unpatentable over Arazi as applied to claim 20, and in view of Narasimhan et al. (U.S. Patent 6,446,192, issued September 3, 2002) ("Narasimhan"). Applicants traverse the rejection.

Arazi, as explained above, converts VBR data into a CBR data stream. The addition of Narasimhan does not bridge the substantial gap between the Arazi arrangement and the claimed invention.

Narasimhan discloses a method and apparatus for remotely monitoring and controlling devices or equipment over a computer network. Narasimhan translates information between network protocol formats and a format of a device; transfers information between the network and device control circuitry; and sends customized software to a client machine over the network. (See Narasimhan at column 3, lines 43-52).

Narasimhan is also silent with respect to the conversion of non-content data into a packet structure compliant with a packet structure of content data. With respect to claim 23 Narasimhan is silent with respect to converting an internet protocol (IP) packet structure into an (HS-ASI) packet structure, as claimed by the combination of Applicants' claim 20 and 23.

Applicants' claim 23 positively recites:

"The apparatus of claim 20, wherein said non-content data comprises an internet protocol (IP) data format."

Applicant respectfully submits that Arazi and Narasimhan either singularly or in any reasonable combination fail to contain the unobvious features of claim 23. At least for the reasons given above, Applicant respectfully submits that the references do render Applicant's invention obvious.

At least for the reasons given above, Applicant requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claim 23.

Claim 28

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The Examiner has rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over Arazi as applied to claim 27, and in view of Gotwald (U.S. Patent No. 5,987,518, issued November 16, 1999) ("Gotwald"). Applicant traverses the rejection.

Arazi does not render Applicants' claim 27 unpatentable. Further, the addition of Gotwald does not render Applicants' claim 28 obvious.

Gotwald discloses the <u>prioritization of messages according to according to at least one of source address, destination address, data type and connection type</u>. (See Gotwald at column 2, lines 19-22).

> The priority queuing provided by priority modules 48, 50 and optionally 52, can be used to provide reserved bandwidth for broadcast services or to provide different levels of quality for specific IP connections. Priority can be based, for example, on the source address for the IP data, the destination IP address, the data type and/or the connection type. The use of source addressing to establish priority is useful in a multicast service, to enable certain services to have a higher priority than others. Destination IP addresses can be used to establish priority based on a level of service purchased by a customer. For example, customers can be offered a high speed, priority Internet access service which will be faster than the standard service purchased by other customers for a lower fee. The IP address of each customer will be used to indicate the priority level depending on the level of service purchased by the customer. (See Gotwald at column 4, line 55 to column 5, line 6).

Both Arazi and silent with respect to the use of <u>predicted bandwidth</u> to assign priority to non-content data for insertion into the output stream. Applicants' claim 28 positively recites:

"The apparatus of claim 27 wherein <u>said predicted bandwidth availability is used to adapt a priority assigned to said non-content data to be inserted into said output stream</u>."

Applicant respectfully submits that Arazi and Gotwald either singularly or in any operable combination fail to contain the unobvious features of claim 28. At least for the reasons given above, Applicant respectfully submits that the references do render Applicant's invention obvious.

At least for the reasons given above, Applicant requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claim 28.

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CONCLUSION

Thus, the Applicants submit that all the claims presently in the application are in condition for allowance. Furthermore, the specification and drawings are not objectionable to and comply with 35 U.S.C. §112. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone either <u>Frank Tolin, Esq. or Eamon J. Wall</u> at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

_3/19/03_

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APPENDIX I
MARKED-UP SPECIFICATION

Please replace the paragraph beginning on page 9, line 5, with the following:

The switch 230 operates to multiplex the output of server module 220 (i.e., the contents of each server module's buffer memory) in, illustratively, a round robin fashion to produce an output stream OUT that is coupled to the transport processor 150 for subsequent transport to the appropriate subscribers 106 via the forward application transport channel (FATC) supported by the distribution network 140. The exemplary embodiment uses a service period of two seconds. Thus, each extent retrieved from a single disk within a disk array [210] 110 comprises approximately two seconds worth of information, illustratively, video information and associated audio information. Thus, in the case of 30 frames per second video, each server module buffer must hold at least 60 frames of video and any associated audio information. Each server module buffer is sized to hold, illustratively, one extent for each of the subscribers served by the respective server module. Thus, in the case of a server module supporting 500 subscribers, the corresponding server module buffer is sized to handle 500 extents (e.g., 500 service periods—1,000 seconds).

Please replace the paragraph beginning on page 10, line 8, with the following:

In the exemplary embodiment, the data signal DATA received from the LAN/WAN 116 comprises internet protocol (IP) packets, while the content data provided to the switch 230 via the server modules 220 is illustratively formatted according to a high-speed version of the structures defined by the Digital Video Broadcasting-Asynchronous Serial Interface (DVB-ASI). The high-speed DVB-ASI (HS-ASI) data structures are described in more detail in commonly assigned (Attorney Docket No. 048), which is incorporated herein by reference in its entirety. Briefly, the HS-ASI data structures or packet format comprises a header portion and a payload portion. The header portion includes destination information and other

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Information useful in routing HS-ASI packets within a network environment, illustratively a ring network or star network provided with high speed optical transmission media, such as described in commonly assigned, simultaneously filed U.S. Patent Application No. 09/458,339[_____ (Attorney Docket No. 051)].

Please replace the paragraph beginning on page 13, line 27, with the following:

The switch module 234 receives content data from the service modules SM_1 through SM_m via respective input ports 1 through m. The content packets forming the content extents received from the server modules [120] 220 are multiplexed to form an output stream which is coupled to the transport processor 150 via the signal path OUT. Additionally, the switch module 234 receives a switch control signal SWC from the switch controller 236 via a control input port C. The switch controller 236 is used to control which input port 1 through m is coupled to the output port O such that the bandwidth capability of the switch module 234 is maximally utilized to transport content to the transport processor 150.

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APPENDIX II
MARKED-UP CLAIMS

11. In an information distribution system comprising server equipment providing content to subscriber equipment via a <u>high speed asynchronous serial interface (HS-ASI)</u> communications channel, server apparatus comprising:

a switch, for multiplexing each of a plurality of content streams provided by respective server modules to produce an output stream <u>adapted</u> for transport via said communications channel;

said switch receiving non-content data from a data source<u>, formatting said received data for use by said communication channel,</u> and responsively multiplexing said <u>formatted</u> non-content data into said output stream on a bandwidth availability basis.

12. The apparatus of claim 11, wherein said switch comprises a buffer for storing said non-content data, said apparatus further comprising:

a switch controller, for determining a bandwidth utilization level of said switch and responsively causing at least a portion of the [contents of] <u>non-content data stored in</u> said buffer to be multiplexed into said output stream when said bandwidth utilization level falls below a threshold utilization bandwidth level.

18. The apparatus of claim 11, wherein said non-content data comprises control data and non-control data, said switch preferentially multiplexing said non-content control data over <u>one of</u> said content data[, said switch preferentially multiplexing said non-content control data over] <u>or</u> said non-content non-control data.

19. The apparatus of claim 17, [wherein said non-content data comprises control data and non-control data, said switch preferentially multiplexing said non-content control data over said content data,] <u>further comprising:</u>

said switch preferentially multiplexing said non-content control data over said non-content non-control data.

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20. Apparatus, comprising:

a switch, for receiving content data streams from each of a plurality of server modules and multiplexing said content data streams to form an output stream <u>transmitted along a high speed asynchronous serial interface (HS-ASI)</u> <u>communications channel</u>, each of said content data streams comprising a plurality of extents, each of said extents defining a respective content portion;

a format converter, for [converting] <u>formatting</u> non-content data <u>for use by said</u> <u>communications channel</u> [from a first format into a second format, said second format being compatible with a format of said content streams]; and

a controller, for receiving said non-content data [in said first format] and for causing said switch to insert corresponding <u>HS-ASI formatted</u> non-content data [of said second format] into said output stream.

21. The apparatus of claim 20, wherein said switch comprises a data buffer for storing said <u>HS-ASI formatted</u> non-content data [of said second format].

23. The apparatus of claim 20, wherein said [first format] <u>non-content data</u> comprises an internet protocol (IP) data format [and said second formal comprises an asynchronous serial interface (ASI) format].

29. A method, comprising:

multiplexing a plurality of content stream portions to produce an output stream, said output stream being adapted to a [forward application transport] <u>high</u> <u>speed asynchronous serial interface (HS-ASI) communications</u> channel;

transmitting said output stream via said [FATC] <u>HS-ASI channel</u>;

determining if said [FATC] <u>HS-ASI channel</u> has associated with it a bandwidth utilization level below a threshold level; and

inserting, into said output stream, <u>HS-ASI channel formatted</u> non-content data in response to available [FATC] <u>HS-ASI channel</u> bandwidth.